CLAIMS

1. An optical disc apparatus for recording the information on an optical disc, comprising

an optical head device including a laser light emitting unit for radiating laser light to said optical disc, and a light detection unit illuminated by return light of radiated laser light to generate an electrical signal containing information components obtained from said optical disc responsive to the illuminating return light; and

a signal processing circuit performing control for reproducing signals recorded on said optical disc or for recording signals on said optical disc, responsive to the electrical signal output from said optical head device;

said light detection unit including

a photoelectric converter unit divided into at least two portions along a direction corresponding to the radial direction of said optical disc;

a multiplication circuit for multiplying an electrical signal, generated by one of said two portions of the photoelectric converter unit, obtained by division in a direction corresponding to the radial direction of said optical disc, with a coefficient t; and

a differential circuit for calculating the difference between the electrical signal generated by the other of said two portions of the photoelectric converter unit obtained by division in the direction corresponding to the radial direction of said

optical disc, and the electrical signal output from said multiplication circuit, to generate a radial push-pull signal;

said coefficient t being set to a value corresponding to a ratio of the volume of return light illuminated on said one of said two portions of the photoelectric converter unit and the volume of return light illuminated on said other of said two portions of the photoelectric converter unit.

2. The optical disc apparatus according to claim 1 wherein

said coefficient t is set to such a value corresponding to a ratio of the average light volume of return light illuminating said one of the two portions of the photoelectric converter unit and the average light volume of return light illuminating said other of the two portions of the photoelectric converter unit, or to a ratio of the light volume, sampled at a preset timing, of return light illuminating said one of the two portions of the photoelectric converter unit and the light volume, sampled at a preset timing, of return light illuminating said other of the two portions of the photoelectric converter unit.

3. The optical disc apparatus according to claim 1 wherein said coefficient t may be set from outside of said light detection unit; and wherein

said signal processing circuit calculates a ratio of an average value of an electrical signal by return light illuminating said one of said two portions of said photoelectric converter unit and an average value of an electrical signal by return light illuminating said other of said two portions, or a ratio of said average value,

sampled at a preset timing, of said electrical signal by return light illuminating said one of said two portions, and said average value, sampled at a preset timing, of said electrical signal by return light illuminating said other of said two portions; said signal processing circuit generating said coefficient t based on the calculated value to set said coefficient t in said photoelectric converter unit.

4. The optical disc apparatus according to claim 3 wherein said signal processing circuit adjusts said coefficient t responsive to an error rate of a signal contained in boundary components of a recording track of said optical disc.

5. The optical disc apparatus according to claim 3 wherein said signal processing circuit adjusts said coefficient t responsive to an error rate of a signal contained in a wobble signal of said optical disc.

6. The optical disc apparatus according to claim 3 wherein said signal processing circuit adjusts said coefficient t responsive to an error rate of a signal contained in a land pre-pit signal of said optical disc.

7. The optical disc apparatus according to claim 1 wherein said light detection unit includes

a first amplifier circuit for amplifying an electrical signal generated by said one of said two portions of the photoelectric converter unit by an amplification factor related to the power of laser light illuminated on said optical disc for recording signals thereon, or to a rotational speed of said optical disc; and

a second amplifier circuit for amplifying the electrical signal generated by

said other of said two portions of the photoelectric converter unit by said amplification factor;

said multiplication circuit multiplying the electrical signal output by said first amplifier circuit with a coefficient t;

said differential circuit calculating the difference between the electrical signal output from said second amplifier circuit and the electrical signal output from said multiplication circuit to generate a radial push-pull signal.

8. A light detection unit for an optical head device configured for radiating laser light to an optical disc for recording and/or reproducing signals for said optical disc, comprising

a photoelectric converter unit divided into at least two portions along a direction corresponding to the radial direction of said optical disc;

a multiplication circuit for multiplying an electrical signal, generated by one of said two portions of said photoelectric converter unit obtained by division along a direction corresponding to the radial direction of said optical disc, with a coefficient t; and

a differential circuit for calculating a difference between an electrical signal generated by the other of said two portions of the photoelectric converter unit obtained by division in a direction corresponding to the radial direction of said optical disc, and an electrical signal output from said multiplication circuit, to generate a radial push-pull signal;

said coefficient t being set to a value corresponding to a ratio of the light volume of return light illuminated on said one of said two portions of said photoelectric converter unit and the light volume of return light illuminated on said other of said two portions.

9. The light detection unit for an optical head device according to claim 8 wherein

said coefficient t is set to such a value corresponding to a ratio of an average light volume of return light illuminating said one of said two portions of the photoelectric converter unit and an average light volume of return light illuminating said other of said two portions of the photoelectric converter unit, or to a ratio of the light volume, sampled at a preset timing, of return light illuminating said one of said two portions of the photoelectric converter unit and the light volume, sampled at a preset timing, of return light illuminating said other of said two portions of the photoelectric converter unit.

10. The light detection unit for an optical head device according to claim 8 wherein

said coefficient t is set from outside the device.

11. The light detection unit for an optical head device according to claim 8 further comprising

a first amplifier circuit for amplifying an electrical signal generated by said one of said two portions of the photoelectric converter unit by an amplification factor related to the power of laser light illuminated on said optical disc for recording signal thereon, or to a rotational speed of said optical disc; and

a second amplifier circuit for amplifying the electrical signal generated by said other of said two portions of the photoelectric converter unit by said amplification factor;

said multiplication circuit multiplying the electrical signal output by said first amplifier circuit with said coefficient t;

said differential circuit calculating the difference between the electrical signal output from said second amplifier circuit and the electrical signal output from said multiplication circuit to generate a radial push-pull signal.

12. An optical head device comprising

a laser light emitting unit for radiating laser light to said optical disc, and a light detection unit illuminated by return light of radiated laser light to generate an electrical signal containing information components obtained from said optical disc responsive to the illuminating return light;

said light detection unit including

a photoelectric converter unit divided into at least two portions along a direction corresponding to the radial direction of said optical disc;

a multiplication circuit for multiplying an electrical signal generated by one of said two portions of said photoelectric converter unit, obtained by division along a direction corresponding to the radial direction of said optical disc, with a coefficient t; and

a differential circuit for calculating a difference between an electrical signal

generated by the other of said two portions of the photoelectric converter unit obtained by division in a direction corresponding to the radial direction of said optical disc, and an electrical signal output from said multiplication circuit, to generate a radial push-pull signal;

said coefficient t being set to a value corresponding to a ratio of the light volume of return light illuminated on said one of said two portions of said photoelectric converter unit and the light volume of return light illuminated on said other of said two portions.

13. The optical head device according to claim 12 wherein

said coefficient t is set to such a value corresponding to a ratio of the average light volume of return light illuminating said one of said two portions of the photoelectric converter unit and the average light volume of return light illuminating said other of said two portions of the photoelectric converter unit, or to a ratio of the light volume, sampled at a preset timing, of return light illuminating said one of said two portions of the photoelectric converter unit, and the light volume, sampled at a preset timing, of return light illuminating said other of said two portions of the photoelectric converter unit.

14. The optical head device according to claim 12 wherein said light detection unit includes

a first amplifier circuit for amplifying an electrical signal generated by said one of said two portions of the photoelectric converter unit by an amplification

factor related to the power of laser light illuminated on said optical disc for recording signals thereon, or to a rotational speed of said optical disc; and

a second amplifier circuit for amplifying the electrical signal generated by said other of said two portions of the photoelectric converter unit by said amplification factor;

said multiplication circuit multiplying the electrical signal output by said first amplifier circuit with said coefficient t;

said differential circuit calculating the difference between the electrical signal output from said second amplifier circuit and the electrical signal output from said multiplication circuit to generate a radial push-pull signal.